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BACKGROUND OF THE INVENTION

This invention relates to dental prophylactic (prophy) angle handpieces, prophy cups, and prophy polish for professional cleaning of teeth.

Rotating prophy cups are generally used to carry and apply prophy paste to the teeth. The prophy paste is comprised of an abrasive, a binder, and a liquefying agent which is used to create a flow of the paste. The prophy cup functions by carrying the prophy paste to the surface of the teeth and the cup material polishes all surfaces of the teeth, including subgingival and interproximal surfaces. Typically the prophy cup picks up the paste by dipping the cup in a reservoir of paste. As the cup is rotated by the prophy angle, the prophy paste exits the cavity and is applied to the tooth. The paste acts as both a lubricant and an abrasive.

Due to the centrifugal rotation of the prophy cup the pumice quickly exit exits the cup and splatters throughout the mouth and on the patient and operator, increasing the risk of cross contamination. Prophy cups have been designed in an attempt to slow down the exiting of the prophy paste. The prophy cup must be repeatedly reloaded, which is time-consuming. Prophy handpieces have been designed to deliver continuous supply prophy paste thus eliminating the need to refill the prophy cup, but do not allow the operator to quickly vary the flow of paste as needed and does not eliminate the splatter problem. A prophy handpiece named the Twist ™ Pat. No. 6,409,507 has been designed to reciprocate 90 degrees rather than to rotate. The Twist ™ claims to produce faster prophys, and no tearing or cutting of soft tissue and no frictional heat. The Twist ™ represents a reasonable attempt to control splatter, but the reciprocating motion is not as efficient as the rotary motion at polishing teeth and does not deliver a continuous supply of prophy paste.

SUMMARY OF THE INVENTION

The present intervention is directed towards a solid core prophy polish to be used in cleaning teeth. Also included are a dental prophy angle and a prophy cup. The prophy cup is comprised of a longitudinal cylindrical body with an interior and exterior, a rear and front end, the rear end contains a shaft which connects to the prophy angle. The prophy cup front end has a circular polishing edge. Adjacent to the polishing edge, towards the body interior, is a circular retaining edge. Contained within the interior of the body of the prophy cup is the longitudinal solid core prophy polish with circumferential circular rings, which are at right angles to the prophy polish's long axis. The solid core prophy polish has a front end which engages the tooth and a second end with an end plate which engages a disc or piston which is fitted to the interior of the body of the prophy cup and is positioned vertical its long axis. Positioned between the body second end and the piston is a longitudinal spring which supplies a continuous dispensing pressure against the solid core polish. The solid core prophy polish is

retained within the interior of the prophy cup by the circular retaining edge which engages the an annular groove of the solid prophy polish. At rest the dispensing force of the spring is countered by the holding force of the retaining edge and the solid core prophy polish is held in place. As the prophy cup is pressed against the tooth surface the annular retaining edge increases in circumference, which releases the retaining edge from the prophy polish's circular ring, which allows the spring to push the polish against the tooth surface, which dispenses the polish during the prophylaxis of the patients teeth. The patient is asked to rinse prior to the prophy which supplies moisture to the tooth surface and rotation of the prophy cup dispenses the prophy polish. The harder the prophy cup is pushed against the tooth surface the quicker the polish is dispatched. The pressure of the tooth against the solid polish counteracts the force of the spring and retains the polish within the prophy cup. Pressure against the tooth dispenses a consistent amount of polish on the tooth. There is no splatter of the prophy polish and the prophy angle may be kept in the mouth from start to finish continuously. The result is minimal, if any, splatter, which reduces cross-contamination and results in a reduction of operating time.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the prophy cup and angle mounted to a dental handpiece;

FIG. 2 is a x-sectional view of the prophy cup containing the prophy polish;

~~**FIG. 3 is the same as FIG.2 with the prophy cup pushed against the tooth surface, releasing the prophy polish;**~~

FIG. ~~4~~ 3 is a x-sectional view of a preferred embodiment off the all-in-one prophy angle;

FIG. ~~5~~ 4 a x-sectional view of a preferred embodiment off the all-in-one prophy angle; and

FIG. ~~6~~ 5 is a x-sectional view of a preferred embodiment off the all-in-one prophy angle.

DETAILED DESCRIPTION OF THE INVENTION

Referring to **FIG.1** a prophy cup **1** is shown attached to a prophy angle dental handpiece **2** which is then attached to a dental handpiece **3**. The dental handpiece **3** provides rotating power to the prophy angle **2** which in turn rotates the prophy cup **1**. The prophy cup is used in combination with a prophy polish in cleaning the teeth. In **FIG. ~~1~~ 2** a preferred embodiment of the invention is shown comprising a prophy cup **1** containing a solid core prophy polish **11.**

The prophy cup **1** of the present invention is shown in **FIGS. 1-~~4~~ 5.** The cup **1** is made of a pliable elastomeric material having a durometer hardness of about 42 to about 70. Preferably the cup **1** is made of a natural rubber or polyisoprene containing a small amount of abrasive. The preferred abrasive in the prophy cup 1 is medium and fine grade pumice. Other abrasives can be used such as hard minerals (Mohs hardness 5 to 9) and softer minerals, such as phosphates (Mohs hardness below 5).

Depicted in **FIGS. 1-~~3~~ 5** the dental prophy cup **1** is comprised of a cylindrical body **12** with a longitudinal axis having a rear mounting portion **13** and a front polishing portion **14**. The rear mounting portion **13** has a recess, or in the alternative, a shaft **17** for attachment to a conventional prophy handpiece **2** for rotation about the long axis of the body **12**. The front polishing portion **14** includes a front surface **15** which defines a skirt which

slopes outwardly towards the front, the diameter of the bottom skirt being greater than the top of the skirt. The top of the skirt defines an annular retaining edge **15,** which retains the solid core prophy polish **12**. The body **12** of the prophy cup **1** is defined by a wall **16** with an inside and an outside. The inside wall is smooth and encloses the solid core prophy polish **11** which has the same axial longitudinal direction as the prophy cup body **12** of the prophy cup **1** and is positioned at the front edge of the inside of the body **12** of the prophy cup **1.** Located within the inside of the body of the mounting portion **13** is a force means which applies pressure on the solid core polish **11** which dispenses the polish towards the surface of the tooth **8.** As the front polish in the front polishing portion **14** of the prophy cup **1** is pressed against the tooth surface **8** the front polishing portion **14** stretches into a larger diameter which also stretches the retaining side **15** into a larger circumferential diameter which releases the retaining side **15** from the corresponding solid core groove **18**. The result is the solid core polish **11** is pressed against the tooth surface by the rear force means **21** and the rotation of the prophy cup **1** releases the prophy polish **11** at a uniform rate. When no loads are placed against the tooth the solid core prophy-polish **11** is retained within the prophy cup **1.**

In a preferred embodiment in **FIGS. 2** and **3** the pressure produced against the solid core prophy polish **11** is produced by an internal spring **21** at the rear end of the prophy cup **1.** The spring pressure is applied to a circular piston which in turn transmits the pressure to the solid core prophy polish **11.**

In **FIG. ~~4~~ 3** is another preferred embodiment. The shaft **~~31~~ 17** is hollow with a 2-4 mm. internal open diameter. The piston is located adjacent to the rear end. The front end of the shaft **17** is a bulbous ball **38** which the prophy cup **1** is fitted and attached to. The prophy cup **1** and the solid core prophy polish **11** may be replaced.

In **FIG. ~~5~~ 4** is another embodiment wherein the means to extrude the solid core prophy polish **11** is liquid or air delivered by a rotational paddle **28** within the prophy angle which delivers the force to the piston which in turn moves the solid core polish **11.**

In **FIG. ~~6~~ 5** is another preferred embodiment wherein the prophy handpiece **2** has an internal cavity which contains a prophy cartridge **38** comprised of metal or plastic which internally contains the wall **16** of the prophy cup **1.** The wall of the prophy cup **1** fits the internal wall **16** of the prophy cartridge **38.** The wall of the prophy cartridge **38** contains an internal screw **31** which fits into a female screw hole **32** of the prophy cup **1**. The prophy cup **1** has an internally contained spring **23,** which dispenses the solid core prophy polish **11** towards the tooth surface **6**. In this embodiment the prophy cartridge **38** is mounted within the prophy angle **2** with bearings **33** and a drive mechanism. The drive mechanism is comprised of an annular gear **36** attached to the outer circumference of the prophy cartridge **38** which engages with the prophy angle **2** drive gear **35**. The prophy angle drive gear 35 is contained and attached within the hollow interior cup-shaped fitting 39 which forms the end of the driveshaft 34 adjacent to the trophy cartridge 38. The entire prophy cartridge **38,** containing the prophy cup **1** and solid core prophy polish **11** rotates during cleaning teeth. This embodiment allows for the largest amount of solid core prophy polish **11** and the replaceability of the prophy cup **1** containing the solid core prophy polish **11** by unscrewing the prophy cup **1** and screwing a new cup **1** on. This allows for the use of a second prophy cup **1** with polish **11** and also allows for a sterilizable re-usable prophy angle **2.**

The solid core prophy polish **11** is comprised of a dental abrasive from a group consisting of pumice, clay, and diatomaceous earth with curing systems such as sodium silicate (3-4 parts)and methyl salicylate (0.24-